PATENT SPECIFICATION

265,299

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PROVISIONAL SPECIFICATION.

Improvements in or relating to Cocks and Valves.

We, F. A. HUGHES & COMPANY, LIMITED, of 204 to 206, Great Portland Street, London, W. 1, a British company, G. D. PETERS & COMPANY, LIMITED, of Windsor Works, Slough, in the County of Buckingham, a British company, and HORACE REGINALD HOCKLEY, of Windsor Works, aforesaid, a British subject, do hereby declare the nature of this invention to be as follows:—

This invention relates to cocks, valves and the like for controlling the supply or flow of compressed air or other fluid under pressure, or for controlling the supply or flow of gases or of water or other liquids from a source of supply to a delivery outlet.

The invention has for its principal object to provide a cock or valve which shall be fluid tight notwithstanding that the fluid to be passed through the cock or valve may be at a high or relatively high pressure, while at the same time permitting the desirable freedom of movement or working of the movable element or valve member within the body or casing of the valve. Further, a valve according to this invention will remain fluid tight, and thus free from leakage, after the cock or valve has been in use a long time. A cock or valve according to this invention is also simple to manufacture.

Briefly a cock or valve according to this invention possesses several important practical advantages as compared with cocks and valves heretofore employed.

A cock or valve according to this invention comprises a body or casing made of a metal or alloy which while being appropriately or comparatively soft, and therefore easily worked or cut, is also comparatively or it may be very dense, and a movable element or valve member made of a hard or relatively hard metal or alloy capable of being ground on a grinding machine to produce a true bearing surface of good finish on the said member or element. The metal or alloy of which the body or casing is made may have a low or comparatively low specific gravity, and preferably has a much lower specific gravity than that of metals or alloys heretofore employed in the bodies or casings of cocks or valves.

In a plug cock according to this invention the plug, which may be a taper or conical plug, may be made of steel (it may be stainless steel), or may be made of cast iron or any other appropriate hard metal which may be case hardened, the metal of the body or casing, in which the plug works, being such that it can be readily reamed to produce therein a seating for the plug which is a dead fit with the plug, the process of hand grinding or lapping heretofore necessary being eliminated or almost entirely eliminated.

The body or casing, including its cap, may be chilled internally and externally, where necessary, to produce the desired homogeneity.

The body or casing of the cock or valve according to this invention may be made from the solid, or the body may be a casting.

The metal of which the body or casing is made preferably has a tensile strength of not less than eight tons per square inch.

A known alloy of which the body or casing of a cock or valve according to this invention may be made comprises a high percentage—it may be as much as 90%—of magnesium, and has a specific gravity of 1.8 or thereabouts.

A known metal or alloy suitable for the manufacture of cocks or valves according to this invention is marketed in the United Kingdom by Messrs. F. A. Hughes & Co., Ltd., of 204 to 206, Great Portland Street, London, W. 1, and is manufactured by Messrs. Sterling Metals

[Price 1/-]

Limited of Coventry, in the County of Warwick, the said alloy being sold under the trade name "Electron". Processes of producing such an alloy are described in the Specifications of Letters Patent Nos. 15,038/08, 6993/09, 23,439/09, 23,441/09, 27,132/09, 29,795/09, 22,016/10. A process of casting such an alloy is described in the Specification of Letters Patent No. 187,943.

Cocks and valves made in accordance with this invention may be of the same constructional form or design as cocks and valves heretofore employed for controlling the supply or flow of fluids, or they may be of any appropriate constructional form or design.

A plug cock or valve having the body or casing made of a metal or alloy having the characteristics hereinbefore mentioned and the plug made of steel as hereinbefore mentioned, has withstood air pressure tests of exceptional severity while providing free working of the plug in the body, these results being obtained, in the manufacture of the valve, with a rapidity and surety not obtainable with previously known metals or their combinations as heretofore employed in such valves.

Dated this 5th day of November, 1925.

JOHN P. O'DONNELL & Co.,
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London, S.W. 1.

COMPLETE SPECIFICATION.

Improvements in or relating to Cocks and Valves.

We, F. A. HUGHES & COMPANY, LIMITED, of 204 to 206, Great Portland Street, London, W. 1, a British company, G. D. PETERS & COMPANY, LIMITED, of Windsor Works, Slough, in the County of Buckingham, a British company, and HORACE REGINALD HOCKLEY, of Windsor Works, aforesaid, a British subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to cocks or valves of the type known as "plug cocks", i.e. such as those employed for controlling the supply or flow of compressed air, gases, water and other fluids or liquids.

The invention has for its principal object to provide a cock or valve which shall be fluid-tight notwithstanding that the fluid to be passed through the cock or valve may be at a high or relatively high pressure, whilst at the same time permitting the desirable freedom of movement or working of the movable element or valve member within the body or casing of the valve. Further, a valve according to this invention will remain fluid-tight, and thus free from leakage, after the cock or valve has been in use a long time. The production or manufacture of a cock or valve according to this invention is also simpler and cheaper than in the case of plug cocks as heretofore manufactured and employed.

The present invention consists in a plug cock the body or casing of which is made of a magnesium alloy sold under the trade name "Electron Metal", or of any other alloy of similar composition, and the plug, which fits and works in the said body, is made of steel, cast iron, malleable cast iron or other appropriate and similarly hard metal.

The above-mentioned alloy, known as "Electron Metal" is a magnesium alloy containing a small or comparatively small percentage of aluminium and a high percentage of magnesium, and has substantially the following characteristics, i.e. the alloy has a specific gravity much lower than that of metals or alloys of which the bodies or casings of plug cocks have heretofore been made, is sufficiently soft to be easily worked or cut while being also sufficiently dense, and has a high or comparatively high tensile strength. Further the said alloy, while being sufficiently soft to enable it to be easily cut or worked and also to enable it to give to a very slight extent should the plug within the body expand, due to a rise in temperature, is yet sufficiently hard for the purposes of a plug cock.

The aforesaid alloy, sold under the trade name "Electron Metal" may, however, contain a small percentage of zinc in addition to a large percentage (approximately 90%) of magnesium and a small percentage of aluminium. Instead of aluminium or zinc and aluminium, other appropriate metals in predetermined or appropriate proportions might be employed together with the large proportion or percentage of magnesium.

The casing or body of a plug cock made of an alloy containing 89—90% magnesium and 11—10% aluminium and having a specific gravity of 1.8 or there-

abouts, and a tensile strength of approximately eight tons per square inch, has been found to give satisfactory results.

The alloy of which the body or casing of the cock is made is such that it can be readily reamed so as to produce therein a true seating for the plug with which seating the ground face of the plug is a true fit, the process or operation of hand grinding or lapping, heretofore necessary for producing the seating in the casing, being eliminated or almost entirely eliminated.

The body or casing of the cock may be made from the solid or it may be a casting, and may be chilled internally and externally to produce the desired homogeneity.

The hereinbefore-mentioned alloy sold under the trade name "Electron Metal" is obtainable in the United Kingdom from Messrs. F. A. Hughes & Co., Ltd., of 204 to 206, Great Portland Street, London, W. 1, and is used in the manufacture of various articles (including castings of various kinds) by Messrs. Sterling Metals, Ltd. of Coventry in the County of Warwick.

The Specifications of Letters Patent Nos. 15,038 of 1908, 6993 of 1909, 23,439 of 1909, 23,440 of 1909, 23,441 of 1909, 27,132 of 1909, 29,795 of 1909, 22,016 of 1910, 182,948 and 187,943, describe processes or methods for the production, purification and casting of magnesium alloys such as the hereinbefore-mentioned "Electron Metal".

"Electron Metal" of which the bodies of plug cocks according to this invention have actually been made contains the following:—

Aluminium	between 3.5 and 4.5	per cent.	
Zinc	between 2.5 and 3.5	,,	,,
Manganese	between 0.25 and 0.7	,,	,,
Copper	not more than - 0.4	,,	,,
Lead	not more than - - 0.4	,,	,,
Tin	not more than - - 0.2	,,	,,
Magnesium	the remainder.		

In the "Electron Metal" alloy composed of the various metals as above set forth, it is desirable that impurities such as iron and silicon should not, respectively, exceed 0.1 per cent. and 0.4 per cent.

The accompanying drawing shows in Fig. 1 an elevation and in Fig. 2 a sectional elevation of a plug cock according to this invention as actually made.

In the drawing A is the body or casing of the cock, the said casing being a casting made of the hereinbefore-mentioned "Electron Metal", and B is the taper plug made of steel and having the through port C formed in it, the said port registering, when the plug is turned to the proper position, with the inlet and outlet ports in the casing A, these parts being similar in form to the corresponding parts of plug valves as heretofore made. D is the screwed head or cap screwed into and closing the lower end of the body A, the usual spring (not shown) being interposed between the said cap D and the adjacent end of the plug B. E is the operating handle of the plug B the head *e* of the handle engaging with the rectangular part *b* of the plug which projects beyond the upper end of the casing A. As shown the head *e* of the handle is secured to the part *b* of the plug B by a pin G.

A plug cock according to this invention, having its body or casing A made of the hereinbefore-mentioned magnesium alloy ("Electron Metal") containing approximately 10% of aluminium, and a conical plug B made of steel, has been subjected to air pressure tests of exceptional severity and found to be perfectly air-tight, while at the same time permitting the desired freedom of working of the plug B within the casing A, these results having been obtained, in the manufacture of the cock, with a rapidity and surety not obtainable with previously known metals, or their combinations, as heretofore employed in plug cocks.

The several parts of the plug valve illustrated in the drawing are similar in form to the corresponding parts of plug valves heretofore made.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A plug cock the body or casing of which is made of a magnesium alloy sold under the trade name "Electron Metal", or of any other alloy of similar composition, and the plug, which fits and works in the said body, is made of steel, cast iron, malleable cast iron or other appropriate and similarly hard metal.

2. The plug cock substantially as described with reference to the accompanying drawings.

Dated this 6th day of August, 1926.

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Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1927.

Al 3.5~4.5
Zn 2.5~3.5
Mn 0.2~0.7
Sn ≤0.4

FIG. 1.

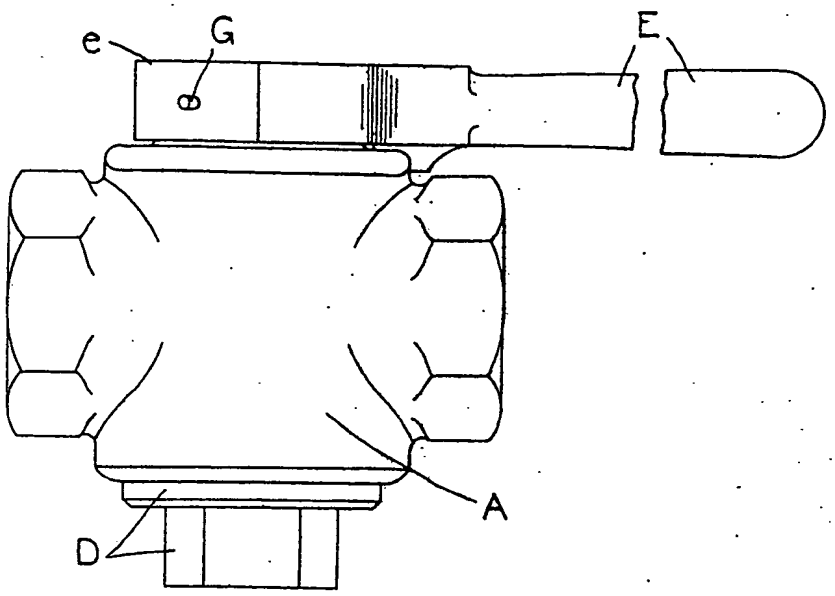
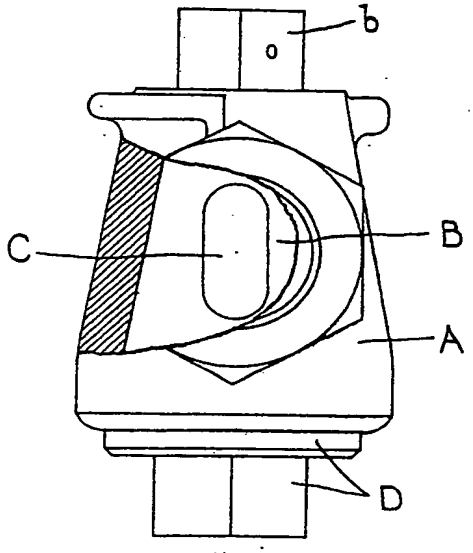


FIG. 2.



Charles & Read Ltd. Photo Litho.